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Equity and Bond Exposures of Convertible Bond Funds: Region Matters

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This paper shows that the characteristics of convertible bond funds (CBFs) differ considerably based on the regional asset allocation of the fund. More specifically, U.S. CBF returns correlate more strongly with equity returns, while European and Asian CBFs returns show a higher correlation with bond returns. This is because U.S. convertibles are more equity-like in nature than European and Asian convertibles, which are constructed more like bonds. Moreover, we show that global CBFs have different characteristics depending on the nationality of the asset management company. A global CBF managed by a European (U.S.) asset management firm exhibits more bond (equity) like features because portfolio managers tend to compose home biased portfolios. Our results have important repercussions for both investors and researchers, as the characteristics of a convertible bond fund will differ based on the regional asset allocation of the fund or based on the domicile of the asset management firm.

Field of research: Finance

Keywords: Mutual Funds, Convertible Bond Markets, Mutual Fund Investment Strategy, Home Bias.

1. Introduction

The global convertible bond market offers an important financial market segment for both investors and credit seekers: at the end of 2011, the global convertible bond market capitalization was equal to $359 billion of which U.S. convertibles represent 57% of the global market, while European and Asian Pacific convertibles account for 24% and 19% of the market, respectively.[1]

Convertible bond funds make a potential interesting investment product, thanks to their ability to combine the advantages of equity with the downside protection of the bond part. Given that a convertible bond can behave anywhere on the spectrum between a pure equity and a pure bond depending on certain design characteristics (like the conversion premium, the maturity and the guaranteed coupon), the specific selection of convertible debt by the convertible bond fund is a crucial determinant for its asset allocation. Research has shown that on average, U.S. convertible bonds are more equity-like than European convertibles, which are more debt-like in nature (Dutordoir and Van de Gucht 2004, 2009). This might be explained by regional differences in the

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[1] Source: Barclays Capital

rationale to issue convertibles or by differences in institutional factors. Indeed, convertibles can be issued as debt-sweeteners to reduce financing costs (Mayers, 1998) or as delayed equity to avoid equity-related adverse selection costs (Stein, 1992). With respect to the institutional setting, Lee and Lee, & Yeo (2009) document that firms in countries with stronger shareholder rights tend to issue more equity-like convertible bonds, while firms in countries with stronger creditor rights rather issue bond-like convertibles. In any instance, convertible bonds cannot be considered to be a homogeneous asset class in terms of their underlying exposures. If investors are unaware of the composition of the convertible bond fund, their resulting risk exposures might deviate significantly from their ex-ante expected exposures, leading to suboptimal portfolios and unwarranted risk exposures.

Our results show that U.S. convertible bond funds are more equity-like than European and Asian convertible bond funds, which correlate stronger with bond factors. More surprisingly, the characteristics of global convertible bond funds depend on the nationality of the asset management company: global funds that are managed by a U.S. management firm have more equity characteristics than global funds managed by an European asset manager; the latter funds being more debt-like. We show that the returns of global CBFs managed by a European management firm are significantly more sensitive to European equity and bond factors than those managed by a U.S. management firm, and vice versa, indicating an overinvestment in the home region. Taking together, these results imply that investors should be aware that the sensitivity of convertible bonds to equity and bond factors and their underlying determinants varies along regional factors like the regional focus of the investment style and asset management firm's domicile.

We provide four main contributions to the existing literature. First, we focus on true convertible bond funds, by selecting funds that invest minimum half of their total assets in convertible bonds. Earlier research on CBFs applies less strict selection criteria, resulting in a sample with more mixed funds. Second, we show that the characteristics of CBFs are region specific: although their proportion invested in convertible bonds, straight bonds and equity is similar, U.S. CBFs are more equity-like than European CBFs. Third, to our knowledge, we are the first to include Asian CBFs as well, and we show that Asian CBFs have equity factor loadings comparable to European CBFs, while their bond factor loadings are somewhere in between those of U.S. and European CBFs. Fourth, we document that the characteristics of *global* CBFs also depend on the nationality of the asset management company: U.S.-managed global convertible bond funds are more equity-like than global convertible bond funds managed in Europe. This is because fund managers overinvest in their home region, thus composing home biased portfolios. The finding of a home bias in global CBFs is interesting on its own, but there is also an important implication for investors. As European convertible bonds are more debt-like, in general, than U.S. convertibles, the home bias in global CBFs has important repercussions for the behavior of these funds: while a global CBF managed by a European portfolio manager will be a debt-like security with a high sensitivity to shifts in the term structure and credit spreads, a global CBF managed by a U.S. management firm will behave more like equity and its price will mainly depend on equity

market fluctuations. Investors who are comparing and evaluating global CBFs should be aware of this crucial difference within this investment category.

The remainder of this paper is structured as follows: in the next section we provide an overview of the literature on convertible bond funds and we provide the characteristics of globally issued convertible bonds in October 2010. In the third section, we describe the data and the methodology, followed by a discussion of the estimation results in section four. The last section concludes.

2. Literature review

Overall the global convertible bond market represents a sizable investment market, with $359 billion in market capitalization at the end of 2011. The U.S. and Japan dominated the convertible bond market in the early nineties, but the European convertible bond market has grown significantly over the past two decades, with European convertibles currently representing one fourth of the total market (Bancel and Mittoo, 2004; Bancel, Mittoo and Zhang, 2009). Before 2008, the main players in the convertible bond market were hedge funds and proprietary trading desks. However, as a result of the demise of the convertible arbitrage hedge funds during the global credit crisis, nowadays, mutual funds, pension funds and insurance companies dominate the market. More specifically, in June 2012, mutual funds alone owned 15 percent of the global convertible bond market (Arrive, 2012). While the majority of the CBF market consisted of convertible arbitrage hedge funds up to 2008, at the end of 2009 the composition was much more balanced, with approximately equal outright and arbitrage participation.[2]

This recent "globalization" and "institutionalization" of the convertible bond market offers interesting investment opportunities and research on these financial assets may provide new insights. The market for convertible bond funds has recently undergone some changes as well: as of June 2012 European convertible bond funds suffered from outflows as a result of the shrinking European market and increased risk aversion in Europe, while global convertible bond funds gained market share: global funds now represent about half of the convertible bond fund market, compared to around 40 percent in 2007 (Arrive, 2012).

The convertible bond market is a unique market segment as convertible bonds are hybrid instruments that give the investor the right to convert the bond in a predetermined number of shares of the issuer. Thus, the convertible bond not only has equity and bond characteristics, the embedded call option on the issuer's equity results in an option-like nature as well. Existing literature on the performance of open-end convertible bond funds (CBFs) is scarce. The earliest study was performed by Kihn (1996), who applies contingent claims analysis to compare the long-run performance of a sample of convertible bond funds with the performance of straight low-grade corporate bonds over the period January 1962 to September 1994. After adjusting for stock and bond market movements, he finds no evidence that CBFs outperform low-grade corporate bonds. His results also corroborate that CBF returns are more (less) sensitive

[2] 2010 Convertible Market Outlook: Back to Basics, Barclays Capital

to stock (bond) market movements than low-grade corporate bonds returns. Khin also evaluates the effect of the embedded options on the convertible bond performance and concludes that only during interest rate call periods, convertible bonds outperform low-grade bonds. During business cycle contractions, equity call periods, or the combination of different option periods, convertibles fail to outperform low-grade bonds. More recently, Domian and Reichenstein (2009) apply a return-based style analysis on a sample of 16 US based convertible bond funds over the period 1998-2007 and find that the average CBF had implied exposures of about 60% stocks, 30% bonds and 10% cash.

Ammann, Kind and Seiz (2010) apply four types of risk factors to explain the performance of U.S. convertible bond funds: (*i*) stock factors as in the four-factor model of Carhart (1997), (*ii*) bond factors related to the term structure and credit risk, (*iii*) option factors such as stock market volatility and non-linear market factors and (*iv*) fund factors related to the specific trading strategies of convertible-bond funds, in particular convertible arbitrage strategies. They find that both equity and bond factors explain the performance of US CBFs, but the option factors have no significant explanatory power. By regressing the CBF abnormal return on fund-specific characteristics, Ammann *et al.* show that, on average, funds with large convertible bond holdings and low equity holdings generate higher abnormal returns. However, the relationship between CBF abnormal returns and the difference in the funds' holdings of convertibles and shares disappears when a proxy for convertible-arbitrage strategies is taken into account.
In contrast to Ammann *et al.* (2010) and Kihn (1996), we focus on globally issued CBFs and construct regional subsamples to investigate the relative importance of the performance drivers for each region.[3] The focus on regional portfolios is important in view of the finding that the characteristics of convertible bonds differ along the origin of the issuer. More specifically, we will divide the total sample of CBFs into three groups depending on their investment strategy: European CFSs, US CBFs and Asian CBFs. Allowing for a regional split in a CBF analysis is motivated by amongst others Dutordoir and Van de Gucht (2004, 2009), who show that European convertibles are more debt-like than US convertibles. Not only the design of the convertible bond differs by region, differences in the characteristics of convertible debt issuing firms have also been documented: US convertible debt issuers are in general small, high-growth firms with high risks (Lewis, Rogalski, and Seward 1999, 2003; Dutordoir and Van de Gucht, 2009), while European issuers tend to be large, mature and financially healthy (Bancel and Mittoo, 2004; Dutordoir and Van de Gucht, 2004). To our knowledge the only study on the Asian convertible bond market is Chang, Chen and Liu (2004) who investigate the motivation for issuing convertible debt and the stock market's response to the announcement of convertible issues in the Taiwanese convertible bond market. However, the authors make no distinction between equity-like and bond-like characteristics of the Taiwanese convertibles.
The design of the convertible bond including the tilt towards a more equity-like or more debt-like instrument is determined by the issuing firm that specifies the conversion ratio,

[3] Kihn (1996) remains silent about the regional scope of his sample of CBFs, but as he uses the S&P 500 as a proxy for the stock market index and data on US Treasury and government bonds as benchmarks, it is reasonable to assume that his sample contains only US CBFs.

the lifetime of the bond and the call period. Additional call and put features can also impact the equity- or debt-like nature of the convertible. For example, mandatory convertibles are mandatorily convertible into shares and thus are more equity-like than plain vanilla convertibles. Lee, Lee and Yeo (2009) show that the characteristics of the convertible debt design are related to a country's level of investor protection: firms in countries with stronger shareholder rights issue convertible bonds that are more equity-like, while firms in countries with stronger creditor rights issue more debt-like convertibles. In their sample of 19 countries, the countries with the strongest shareholder rights are the U.S., the U.K., Canada, India and Hong Kong, while the countries with the strongest creditor rights are the U.K., Hong Kong, Germany, the Netherlands, Malaysia and Singapore.

In order to get a better understanding of the regional differences between convertible bonds, Table 1 shows the characteristics of the convertibles that were included in the UBS Global convertible bond index at the end of October 2010. Retaining only the convertibles from the United States, Europe and Asia, results in a total sample of 364 convertible bonds, of which 150 U.S. convertibles, 110 European convertibles and 104 Asian convertibles. To determine whether regional convertible bonds are more equity-like or more bond-like, we compare the specific parameters of the convertibles constituting the UBS Global bond Index. These characteristics are the delta (δ), the volatility of the underlying stock return (σ_i), the conversion premium (cp) and the maturity (m). Delta measures the sensitivity of the value of the convertible bond to changes in the underlying stock's price. Thus, the higher the delta, the more equity-like the convertible bond. Table 1 shows that delta is, on average, the highest for U.S. convertibles $(\delta_{US} = 54)$ and the lowest for Asian convertibles $(\delta_{Asia} = 37)$, while the average delta for European convertibles is equal to 47. The equity option value of a convertible is positively correlated with the volatility of the underlying stock provided that the conversion probability increases with volatility. Hence, a convertible will be more equity-like the higher the volatility of its underlying stock (Loncarski, ter Horst and Veld, 2009). In line with the findings for delta, the average volatility of the underlying stock price is the highest in the U.S. $(\sigma_{US} = 32.5)$ and the lowest for Asia $(\sigma_{Asia} = 28.7)$, with an intermediate value for Europe $(\sigma_{Eur} = 29.9)$. The conversion premium is equal to the difference between the conversion value and the stock price, relative to the stock price. Thus, the conversion premium measures the extent by which the conversion value exceeds the stock value. Kim (1990) shows that convertible bonds with high conversion ratios, which imply a low conversion premium, are relatively more equity-like than convertible bonds with a high conversion premium: a low conversion premium indicates that the convertible bond is more likely to become in-the-money and thus will be converted into equity. Similar to the average delta and volatility, the conversion premium also indicates that U.S. convertibles are the most equity-like: the average conversion premium is the lowest in the U.S. $(cp_{US} = 64.1)$ and the highest in Europe $(cp_{Eur} = 72.2)$. However, there seems to be a large variation in conversion premia, indicated by the huge standard deviations. Lastly, convertibles with a high maturity are more equity-like, as they have a higher likelihood of becoming in-the-money over the lifetime of the bond. In line with the other characteristics, the average maturity is the highest in the

U.S., with an average lifetime for the convertible bonds of more than 13 years, while Asian and European convertibles have, in general, a much lower maturity.
Next, Table 1 also reports some general parameters of the convertible debt design across the different regions. The average coupon rate paid by U.S. convertible bonds is 4.2 percent, by European convertibles is 3.6 percent and Asian convertibles pay an average coupon of 1.2 percent. As the coupon rate crucially depends on the risk-free rate, credit spreads are more informative than coupon rates. Credit spreads on European and U.S. convertibles are comparable (457 bps and 471 bps, respectively), while credit spreads on Asian convertible bonds are rather low (297 bps on average). To summarize, the data in Table 1 confirms findings reported in previous literature and indicates that U.S. convertible bonds are more equity-like than European convertibles. Asian convertibles have the most debt-like characteristics.

Table 1: Design Characteristics of Global Convertible Bonds, October 2010

Region	**Asia**		**Europe**		**U.S.**	
	mean	std. dev.	mean	std. dev.	mean	std. dev.
Delta (δ)	37.2	29.1	46.6	26.1	54.1	29.3
Volatility underlying (σ_i)	28.7	8.8	29.9	8.6	32.5	9.9
Conversion premium (cp)	65.4	66.5	72.2	118.3	64.1	101.5
Maturity (in years, (m))	6.5	3.3	6.1	2.4	13.7	10.7
Coupon (in %)	1.2	1.8	3.6	1.7	4.2	9.6
Credit spread (in bps)	296.5	235.1	457.3	357.0	471.2	360.0
Market Cap (USDm)	633.1	436.3	769.2	627.2	911.2	697.3
N	104		110		150	

Source: UBS Global Convertible Constituents List

3. Data and Research Design

3.1 Data: Convertible bond funds

We collected weekly data on all convertible bond funds between January 2000 and May 2011 from Morningstar and Datastream. The motivation to work with weekly data is twofold. First, as some funds are relatively short-lived, we are required to select prices on a weekly basis in order to obtain a sufficiently large number of observations for each fund. Second, the funds in our sample are all actively managed portfolios. Thus, it is reasonable to assume that portfolio managers trade more frequently than once a month. Funds were selected based on the Morningstar category "Convertible Bond". We eliminate convertible arbitrage funds because their pay-off structure is particular and cannot be compared with long-only funds. More specifically, the convertible arbitrage strategy involves a long position in the convertible bond combined with a short position in its underlying equity, such that a delta-neutral position is obtained. The convertible arbitrage investor assumes that the embedded options in the convertible are priced inefficiently, which would then lead to a positive return on this market-neutral strategy. We require funds to have at least 50 percent of their assets invested in convertible bonds, to make sure that our sample contains no balanced funds that “accidentally” contain some convertibles. In addition, funds should have at least 100 observations and information on the management company and regional orientation should be present. Starting from a sample of 302 open-end long only CBFs, we have a final dataset of 265

CBFs, of which 118 European CBFs, 26 U.S. CBFs, 18 Asian CBFs and 103 global CBFs.[4] Of these global funds, 70 funds are managed by a European-based fund manager, while 33 are managed by a U.S.-based fund manager. Weekly fund returns are calculated in U.S. dollar. Table 2 displays the average asset allocation of the CBFs in our sample, the standard deviation of the average, and the minimum and maximum weight in each asset class. Negative weights in the category "Other" can be caused by leveraged products like futures and options.

The summary statistics reported in Table 2, provide no indication that the U.S. funds are more equity-like than the European funds. If anything, the percentage of straight debt (equity) in U.S. CBFs is larger (smaller), on average, than the percentage of these asset weights in European CBFs, although the difference is only marginal. A statistical test for the equality of means in asset holdings cannot reject the hypothesis of an equal average proportion of convertible, straight bond or equity holdings between European and U.S. funds. Only the relative underweight of straight bonds in Asian CBFs relative to European CBFs is statistically significant.[5] Thus, if there is a difference between the fund categories in terms of equityness, this should be caused by the instrument characteristics of the selected assets, not by a different asset allocation process.

[4] Our sample differs greatly from Ammann *et al.* (2010), who use a total sample of 114 U.S. CBFs. The reason for this is that they include convertible arbitrage hedge funds and their definition of a CBF is less strict: they include funds that have a proportion of zero to 98 percent of their total assets invested in convertible bonds, with an average of 38 percent. The minimum proportion of convertible bonds in our funds is 50 percent, with an average of 77 percent.

[5] The t-statistics of the difference in means tests can be obtained from the authors on request.

Table 2: Average Asset Allocation of Convertible Bond Funds
This table reports the asset allocation statistics for the 265 funds in our sample. We show the average asset allocation over the sample period January 2000 - May 2011, the standard deviation of the average asset allocation, and the minimum and maximum holdings in each asset category. Negative weights in the category "Other" can be caused by leveraged products like futures and options.

		Average Asset Allocation			
Convertible bond funds	% CB	% Straight bond	% equity	% cash	% other
European	74.49	14.34	3.86	7.73	-0.41
U.S.	79.55	16.79	2.48	3.76	-2.58
Asian	79.72	9.87	4.41	5.85	0.15
Global	76.05	14.44	2.53	7.17	-0.18
		Standard Deviation of Average Asset Allocation			
	% CB	% Straight bond	% equity	% cash	% other
European	12.08	8.80	5.78	6.21	2.28
U.S.	13.48	14.85	3.34	4.19	6.48
Asian	15.00	8.36	6.88	5.32	0.77
Global	11.51	10.15	4.47	5.91	1.41
		Minimum Asset Allocation			
	% CB	% Straight bond	% equity	% cash	% other
European	50.41	0.35	0.00	-0.29	-16.91
U.S.	54.20	0.00	0.00	-1.47	-20.39
Asian	52.27	0.00	0.00	-5.24	-2.05
Global	50.88	0.00	0.00	-21.03	-9.50
		Maximum Asset Allocation			
	% CB	% Straight bond	% equity	% cash	% other
European	93.61	44.32	38.18	31.69	2.01
U.S.	100.00	46.12	11.28	18.30	0.86
Asian	99.03	30.21	24.90	20.22	2.84
Global	99.47	57.00	21.36	28.46	2.09

Table 3 presents the average distribution moments for each regional CBF category. Over the sample period January 2000 to May 2011, CBFs had an annualized 7 percent return with a standard deviation of 13.8 percent, a negative skewness and a leptokurtic return distribution. U.S. funds seem to have underperformed European and Asian funds, but the underperformance can be explained by the depreciation of the dollar relative to other main currencies, the euro and the yen, over our sample period (one dollar was worth 97 eurocents in January 2000, while in May 2011, the dollar traded at only 70 eurocents).

Table 3: Distribution Moments for the Regional Convertible Bond Funds – U.S. Dollar

This table shows the sample moments of the weekly returns from January 2000 to May 2011 of 118 European CBFs, 26 U.S CBFs, 18 Asian CBFs and 103 global CBFs. 70 global funds are managed in Europe, 33 global funds are managed in the United States. Sample moments are annualized and expressed in USD.

Convertible bond funds	Mean return	Std dev	Skewness	Kurtosis
European	7.45%	13.88%	-0.02	3.01
US	3.22%	13.66%	-0.80	3.89
Asian	7.81%	13.16%	-0.07	3.05
Global	7.53%	14.01%	-0.10	3.88
- with US manager	5.38%	12.72%	-0.34	3.36
- with European manager	7.71%	14.32%	-0.08	3.85
TOTAL	7.07%	13.86%	-0.13	3.47

Next, we turn to the description of the explanatory variables.

3.2 Data: Explanatory variables

Convertible bonds are exposed to different sources of risk: the bond component is vulnerable to interest rate and default risk, the equity component implies a sensitivity to changes in the underlying equity price and the implied call option of the convertible creates nonlinearities in the pay-off, and thus the convertible bond return may also be driven by option factors. Therefore, we we consider three factors that could help explaining the returns of CBFs: (1) equity factors, (2) bond factors and (3) option factors.[6]

3.2.1 Equity factors

Equity returns can drive convertible bond returns, as the price of the convertible bond depends partially on the price of its underlying equity. The larger the delta of the convertible, the more sensitive CB price changes are to price changes of the underlying equity. To capture the equity characteristics of the CBFs, we include the return on a general stock index for each region, respectively the weekly return for the MSCI Europe, MSCI US, MSC AC Asia and MSCI World.

3.2.2 Bond factors

Plain vanilla convertible bonds can be considered as a combination of a straight bond and a call option on the underlying equity. Thus, intuitively, bond factors can play an important role as drivers for convertible bond returns. Also, as shown in Table (1), convertible bond funds invest part of their assets directly in straight bonds. Following Ammann *et al*. (2010), Fama & French (1993), and Elton, Gruber, & Blake (1999), we include four bond factors: (1) TERM, which captures unexpected changes in the term structure and is constructed as the difference between the return on the long term (10y+) government bond index and the one month treasury bill rate; (2) DEFT, which

[6] Ammann et al. (2010) include a fourth factor, notably the return on a convertible arbitrage index, to capture variations in returns arising from a convertible arbitrage strategy. As we have excluded the convertible arbitrage hedge funds from our sample, there is no need to consider this variable. In addition, to our knowledge, no region-specific convertible arbitrage indices are available.

measures the effect of default risk and is composed as the difference between the return on a long term corporate bond index and the return on the long term (10y+) government bond index; (3) HY, which is a proxy for both the term and the credit premium and is equal to the return on a high yield bond index; and (4) BOND, a general bond factor, which is the excess return of an aggregate bond index. All data is retrieved from Datastream.

3.2.3 Option factors

A third category of factors that may determine CBFs returns are option factors. As a convertible bond can be considered as a combination of a straight bond and a call option, the payoff profile of the convertible is typically non-linear. Also, some convertibles contain additional options such as a callability for the issuer and/or puttability for the bond holder. Following Ammann *et al.* (2010), we include three option factors to the regression specification. The first factor, VOLA, captures the implied volatility of the underlying equities and is calculated as the weighted average standard deviation of the underlying equities of the convertible bonds that are constituents of the regional UBS Convertible Bond indices. In line with Ammann, Kind, and Wilde (2003), rolling volatilities are calculated based on the daily returns of the last two years. A drawback of using historical volatility instead of implied volatility is that the former is backward looking, while the latter is forward looking – i.e. the expected volatility of the stock during the lifetime of the bond, which is a more relevant measure for determining price changes for convertible bonds. Ammann *et al.* (2010) apply the return on the CBOE Volatility VXO Index as a measure for implied volatility. Although this index does measure implied volatility, it has some disadvantages when used as a factor for explaining convertible bond returns: first, the VXO Index is based on the implied volatilities of the stocks in the S&P 100 Index, which are not representative for the typical convertible debt issuers in the U.S., which are usually small firms. Second, the VXO Index is based on the U.S. market only, while we need implied volatilities for different regions and on a global scale. A solution would be to extract implied volatilities from at-the-money option prices, but as most traded options have a shorter maturity than the average convertible bond, this procedure is far from ideal either. Thus, the use of historical volatilities of the stocks underlying the convertible bonds of the UBS indices seems a reasonable compromise.

The second and third option factors (NL_1 and NL_2) are created to capture the non-linearity in the convertible bond returns (Ammann *et al.* , 2010; Henriksson and Merton, 1981, Treynor and Mazuy, 1966). NL_1 is constructed as the maximum of the stock return minus the bond return, and zero. The stock return is the value weighted return of the underlying equities of the constituents of the UBS Convertible bond indices and the bond market return is measured by the Barclays Aggregate bond index for each region. NL_2 is equal to the squared return of the value weighted index of underlying equities in excess of the one month risk-free rate.

The respective indices that were used to compose the equity, bond and option factors are presented Table (A.1) of the Appendix.

3.3 Research design

Our analysis consists of two main parts. First, we examine whether regional convertible bond funds have different equity-like, debt-like or option-like characteristics. Therefore, we run the following panel regression:

$$cbf_{i,r,t} = \alpha + \sum \beta_r * eq_{r,t} + \sum \gamma_r * bd_{r,t} + \sum \delta_r * op_{r,t} + \varepsilon_{i,r,t}, \quad (1)$$

where $cbf_{i,r,t}$ represents the return of convertible bond fund *i* from region *r* at time *t*, eq are the equity factors, bd are the bond factors, op are the option factors and $\varepsilon_{i,r,t}$ are independent normally distributed errors.

As a modified Wald test for groupwise heteroskedasticity rejects the null hypothesis of homoskedastic errors and a Wooldridge test for autocorrelation rejects the null hypothesis of no first order autocorrelation, we need to adjust the standard errors of the coefficient estimates. Properly correcting for dependence in the residuals is important: Petersen (2009) reports that 42 percent of recently published papers in leading finance journals, that use panel data, did not adjust the standard errors correctly. A common methodology to correct for heteroskedasticity in panel data is to modify standard errors as proposed in Beck and Katz (1995). However, this method doesn't correct for autocorrelation. To circumvent this problem, panel adjusted Newey-West standard errors can be applied, or alternatively, one can correct the Beck and Katz (1995) standard errors for first order autocorrelation. Another drawback of the Beck and Katz standard errors is that the finite sample properties of their estimator are rather poor when the panel's cross sectional dimension is large compared to the time series dimension (Hoechle, 2007). In view of the discussion above, we opt for applying Driscoll & Kraay (1998) corrected errors which correct not only for heteroskedasticity and autocorrelation but also for cross-sectional or spatial correlation. Spatial dependence occurs when the cross-sectional units are subject to both observable and unobservable common disturbances. More specifically, in our case, the cross-sectional units are the individual CBFs, which may respond to aggregate market shocks. Basically, Driscoll and Kraay apply a Newey-West type correction to the sequence of cross-sectional averages and moment conditions, which results in a covariance matrix estimator that is consistent and independent of the cross-sectional dimension.[7] Next, we apply pairwise Chi-squared tests on the respective coefficient estimates to verify whether the regional factor loadings are significantly different.

The second research interest is based on global CBFs, notably we examine whether U.S. based asset managers compose global convertible funds that have different characteristics than the global CBFs managed by European asset managers. The common way to test for manager-specific factor loadings is to create a dummy variable for each manager's region (Europe versus the U.S.) and run following model:

[7] Alternative estimation methods notably pooled OLS, fixed effects with robust standard errors, a model with clustered regional effects, and Beck and Katz (1995) panel corrected standard errors with correction for first order autocorrelation lead to slightly lower standard errors of the coefficient estimates, but the majority of the significance levels remain unchanged. These alternative estimation results are available upon request.

$$gcbf_{i,t} = \alpha + \sum \beta^{eu} * D^{eu} * eq_{g,t} + \sum \beta^{us} * D^{us} * eq_{g,t} + \sum \gamma^{eu} * D^{eu} * bd_{g,t} + \sum \gamma^{us} * D^{us} * bd_{g,t} + \sum \delta^{eu} * D^{eu} * op_{g,t} + \sum \delta^{us} * D^{us} * op_{g,t} + \varepsilon_{i,t}, \quad (2)$$

where D^{eu} and D^{us} are respectively the dummy variable for European-based managers and U.S. based managers, $gcbf_{i,t}$ represents the return on global convertible bond fund *i* at time *t*, and the subscript g refers to global equity, bond and option factors. Note that:

$$D^{eu} + D^{us} = 1 \quad (3)$$

Next, a Wald or Chi-squared test on the coefficient estimates can determine whether the U.S.-based managers have larger factor loadings for equity, bond and option factors than the factor loadings for European-based managers.

The regression specification in equation (2) can be rewritten such that we only need to use one dummy variable and no longer need to run Wald tests to check for the equality of coefficient estimates (Yip and Tsang, 2007):

$$gcbf_{i,t} = \alpha + \sum \beta^{eu} * eq_{g,t} + \sum (\beta^{us} - \beta^{eu}) * D^{us} * eq_{g,t} + \sum \gamma^{eu} * bd_{g,t} + \sum (\gamma^{us} - \gamma^{eu}) * D^{us} * bd_{g,t} + \sum \delta^{eu} * op_{g,t} + \sum (\delta^{us} - \delta^{eu}) * D^{us} * op_{g,t} + \varepsilon_{i,t}. \quad (4)$$

While equation (2) and (4) are mathematically equivalent, the interpretation of the estimation results is slightly different. For example, in both regression specifications, the first coefficient of $eq_{g,t}$ (β^{eu}) represents the impact of global equity returns on the return of global CBFs managed by a European-based asset manager; that is, the first part of equation (4) does not measure a "main" equity effect. Thus, the equity loading of global CBFs managed by European-based asset managers serves now as the base. In equation (4), the coefficient estimate of $D^{us} * eq_{g,t}$ represents the differential effect of U.S.-based management firms over European-based management firms. Thus, a positive coefficient estimate $b = (\beta^{us} - \beta^{eu})$ implies that U.S.-based managers compose global portfolios that are more equity-like than those of European-based managers. The interpretation of the factor loadings for the bond and option factors is similar.

Next, we turn to the presentation and the discussion of our results.

4. Results

4.1 Regional convertible bond funds

Table 4 presents the estimation results for the regression expressed in equation (1), in which we test the drivers of regional CBFs. Table 5 shows the corresponding pair-wise Chi-squared tests for the equality of coefficient estimates. A first observation from Tables 4 and 5 is that over all regression specifications, U.S. CBFs have significantly higher factor loadings for the equity term than European and Asian CBFs. U.S. CBFs have an implied equity exposure of 46 to 58 percent, while Asian and European CBFs have equity factor loadings of about 30 percent. European CBFs score slightly higher

factor loadings for the equity term than Asian CBFs, but the difference is significant only in four out of six regression specifications. This indicates that U.S. CBFs are more equity-like than European and Asian CBFs.

Next, we turn to the bond factors. In the first regression specification, including a term factor and a default factor, European CBFs have considerably stronger bond characteristics than U.S. and Asian CBFs. Similarly, when we include only a general bond term, the factor loading for the European CBFs is significantly higher than the one for the U.S. and Asian. Interestingly, when we include both a term factor and a high yield factor, high yield factor loadings for the European CBFs are similar to those of U.S., notably about 33 percent. A potential explanation for this is that since high yield bonds are typically high volatility assets, they might pick up some equity effect, or at least behave more like stocks than (investment grade) corporate bonds. The higher factor loadings for the high yield term relative to the term and general bond factor for U.S. CBFs can be explained by the fact that that the typical firm issuing convertible bonds in the U.S. is a small, high risk one (Lewis, Rogalski, and Seward 1999, 2003; Dutordoir and Van de Gucht, 2009).

Finally, the evidence for option factors as drivers for CBF returns is weak. In line with Ammann *et al.* (2010), the volatility factor (*vola*) is insignificant in most of our regression specifications. We find a significantly negative coefficient estimate for NL1 and NL2 in Asia, which is contradictory to our expectations. For European CBFs, the estimates of the NL1 and NL2 factors are not consistent over the different regression specifications.

Table 4: Estimation Results Regional CBF Returns

	(1)		(2)		(3)		(4)		(5)		(6)	
	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.	coeff	s.e.
						Equity factors						
eq_eur	0.338***	0.024	0.308***	0.027	0.272***	0.026	0.325***	0.019	0.292***	0.019	0.249***	0.017
eq_us	0.507***	0.022	0.555***	0.031	0.461***	0.033	0.531***	0.028	0.576***	0.023	0.521***	0.027
eq_asia	0.309***	0.022	0.291***	0.021	0.312***	0.022	0.287***	0.019	0.275***	0.018	0.290***	0.020
						Bond factors						
term_eur	0.552***	0.027			0.301***	0.032	0.564***	0.024			0.316***	0.032
term_us	0.103**	0.040			0.020	0.033	0.088**	0.036			0.002	0.028
term_asia	0.272***	0.033			0.269***	0.033	0.301***	0.035			0.297***	0.035
deft_eur	0.709***	0.089					0.730***	0.084				
deft_us	0.434***	0.075					0.395**	0.081				
deft_asia	0.055	0.043					0.070	0.045				
bond_eur			0.668***	0.028					0.682***	0.024		
bond_us			0.188*	0.111					0.162*	0.097		
bond_asia			0.362***	0.040					0.392***	0.041		
hy_eur					0.322***	0.032					0.326***	0.032
hy_us					0.364***	0.045					0.331***	0.052
						Option factors						
vola_eur	0.000	0.003	0.004*	0.002	0.000	0.003	-0.001	0.003	0.004*	-0.002	-0.001	0.003
vola_us	-0.001	0.003	0.001	0.003	-0.002	0.002	0.002	0.003	0.005*	0.003	0.001	0.003
vola_asia	0.004	0.003	0.003	0.003	0.004	0.003	0.005	0.003	0.004	0.003	0.004	0.003
NL1_eur	-0.027	0.036	-0.029	0.035	-0.043	0.033						
NL1_us	0.040	0.041	0.043	0.052	0.099*	0.051						
NL1_asia	-0.052**	0.025	-0.039	0.026	-0.053**	0.025						
NL2_eur							0.034	0.197	-0.176	0.239	-0.071	0.203
NL2_us							-0.286	0.285	-0.542	0.304	-0.080	0.321
NL2_asia							-0.325***	0.069	-0.332***	0.066	-0.318***	0.075
Constant	0.000	0.001	-0.001	0.001	0.000	0.001	0.000	0.001	-0.001*	0.001	0.000	0.001
Adjusted R^2	0.676		0.684		0.690		0.665		0.675		0.689	

* 10% significance
** 5% significance
*** 1% significance

Table 5: Chi-Squared Tests for the Equality of Coefficient Estimates, Regional Convertible Bond Funds

	(1)		(2)		(3)		(4)		(5)		(6)	
	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value	Chi-square	p-value
						Equity factors						
eq_eur = eq_us	34.92***	0.000	48.83***	0.000	25.93***	0.000	59.01***	0.000	193.00***	0.000	121.17***	0.000
eq_eur = eq_asia	1.23	0.267	0.33	0.566	1.82	0.177	3.17*	0.075	0.57	0.449	3.88**	0.049
eq_us = eq_asia	47.28***	0.000	52.64***	0.000	15.05***	0.000	64.73***	0.000	113.23***	0.000	59.01***	0.000
						Bond factors						
term_eur = term_us	112.46***	0.000			38.88***	0.000	147.98***	0.000			56.77***	0.000
term_eur = term_asia	42.98***	0.000			0.71	0.400	43.06***	0.000			0.23	0.631
term_us = term_asia	11.27***	0.001			32.06***	0.000	21.19***	0.000			51.14***	0.000
deft_eur = deft_us	4.88**	0.028					7.6***	0.006				
deft_eur = deft_asia	51.35***	0.000					60.67***	0.000				
deft_us = deft_asia	19.23***	0.000					13.66***	0.000				
bond_eur = bond_us			20.82***	0.000					31.97***	0.000		
bond_eur = bond_asia			39.53***	0.000					46.76***	0.000		
bond_us = bond_asia			2.10	0.148					5.43**	0.020		
hy_eur = hy_us					1.25	0.264					0.01	0.906
						Option factors						
vola_eur = vola_us	0.26	0.612	1.32	0.251	0.74	0.391	0.93	0.335	0.16	0.690	0.82	0.367
vola_eur = vola_asia	0.99	0.321	0.11	0.746	0.84	0.360	2.64	0.105	0.00	0.989	1.96	0.162
vola_us = vola_asia	2.00	0.158	0.25	0.619	2.77*	0.096	0.64	0.425	0.13	0.719	0.74	0.392
NL1_eur = NL1_us	1.50	0.221	1.44	0.230	5.63**	0.018						
NL1_eur = NL1_asia	0.22	0.638	0.03	0.854	0.03	0.855						
NL1_us = NL1_asia	4.92**	0.027	2.41	0.121	8.01***	0.005						
NL2_eur = NL2_us							0.97	0.326	0.73	0.394	0.00	0.980
NL2_eur = NL2_asia							2.59	0.108	0.32	0.569	1.10	0.296
NL2_us = NL2_asia							0.02	0.881	0.54	0.462	0.63	0.426

* 10% significance
** 5% significance
*** 1% significance

4.2 Global convertible bond funds

Next, we focus on global CBFs. Our main research objective is to identify whether global CBFs have different characteristics depending on the domicile of the asset manager. More specifically, our data confirm the finding of earlier research that shows that U.S. convertible bonds are more equity-like than European convertibles. Therefore, we are interested to know whether U.S. asset managers compose global CBFs that are more equity-like than the global CBFs managed by European portfolio managers? Table 6 contains the estimation results of the regression specification expressed in equation (2), where global CBF returns are regressed on global equity, bond and option factors. The funds managed by a European management firm serve as the base case, and the coefficient estimates for the factors multiplied with the manager-dummy represent the differential effect of a U.S.-based manager over the effect of a European-based manager.

Table 6: Global Convertible Bond Funds, Global Factors

	(1)		(2)		(3)		(4)		(5)		(6)	
	coeff	s. e.	coeff	s. e.	coeff	s. e.	coeff	s. e.	coeff	s. e.	Coeff	s. e.
						Equity factors						
eq_g	0.171***	0.039	0.505***	0.045	0.0698	0.045	0.140***	0.027	0.425***	0.037	0.137*	0.074
D^{us} * eq_g	0.081***	0.025	-0.074**	0.029	0.094***	0.024	0.101***	0.016	-0.033*	0.020	0.075**	0.037
						Bond factors						
term_g	1.704***	0.078			1.594***	0.063	1.717***	0.071			1.577***	0.037
D^{us} * term_g	-0.658***	0.032			-0.701***	0.027	-0.665***	0.031			-0.690***	0.022
deft_g	0.145*	0.082					0.147*	0.078				
D^{us} * deft_g	0.066**	0.028					0.066***	0.025				
bond_g			1.571***	0.104					1.639***	0.105		
D^{us}* bond_g			-0.559***	0.054					-0.595***	0.053		
hy_g					0.323***	0.076					0.885***	0.219
D^{us} * hy_g					-0.008	0.030					-0.253***	0.095
						Option factors						
vola_g	-0.000	0.004	0.001	0.005	-0.003	0.004	0.000	0.004	0.001	0.005	0.000	0.009
D^{us} * vola_g	0.002	0.002	0.002	0.002	0.003*	0.002	0.002	0.001	0.002	0.002	0.000	0.004
NL1_g	-0.044	0.048	-0.127**	0.063	-0.025	0.048						
D^{us} * NL1_g	0.028	0.028	0.067*	0.036	0.015	0.025						
NL2_g							-0.417**	0.199	-0.800***	0.304	-0.031	0.353
D^{us} * NL2_g							0.303***	0.108	0.394***	0.141	0.238*	0.138
Constant	-0.000	0.001	-0.001	0.001	-0.000	0.001	-0.000	0.001	-0.001	0.001	-0.001	0.002
Adjusted R^2	0.577		0.518		0.588		0.577		0.518		0.446	

* 10% significance
** 5% significance
*** 1% significance

A first observation from Table 6 is that the factor loadings on global equity returns differ significantly depending on the bond factors included in the regression specification: when we include the general bond factor, global CBF managed by a European portfolio manager have an equity loading of about 50 percent, while this factor loading drops to zero when we include a global high yield factor. Similarly, the equityness of U.S.-managed global CBFs relative to European-managed global CBFs differs depending on the type of bond factors added to the regression: when we include a term and default factor or a term factor and a high yield factor, global CBFs managed by a U.S. portfolio manager have higher equity factor loadings than CBFs managed in Europe, while the opposite is true when we include a general bond factor.

However, the bond factors do indicate that global CBFs managed in Europe have more bond characteristics than global CBFs managed from the U.S.. Apart from the default term, all bond factors are significantly higher for funds managed by a European manager than for those managed by a U.S. managers. Therefore, although the evidence that U.S managed funds are more equity-like than European managed funds is weak; we do find convincing evidence for the hypothesis that European managed funds are more bond-like than U.S. managed firms. In line with our results for the regional CBFs and the findings of Ammann et al. (2010), we find no convincing evidence for option factors as drivers for global CBF returns.

Our results may have important consequences for investors. When buying a global CBF, investors should be aware that the characteristics of this fund can be utterly different depending on the management firm from which they are buying. A European investors who buys a global CBF from a U.S. asset manager, might expect this fund to behave like a straight bond portfolio, while actually the fund will be more equity-like and vice versa. Also, portfolio managers should be aware that the personal benchmarks applied by investors might be more bond-like for European investors and more equity-like for U.S. investors.

A potential explanation for the different characteristics of global CBFs is that portfolio managers tend to compose home biased portfolios, *i.e*. U.S. portfolio managers overweight U.S. convertibles while European asset managers overweight European convertibles. This preference for domestic assets creates global portfolios that have considerably different characteristics depending on the management company. Empirical research has shown that fund managers deliberately create home-biased portfolios (amongst others Chan, Covrig, and Ng, 2005; Lütje and Menkhoff, 2007; Hau and Rey, 2008). These studies mainly focus equity funds. So far, there is no evidence on the portfolio composition of (convertible) bond funds, but we assume that bond portfolio managers exhibit similar investor behavior than equity fund managers. We don't have a information on the individual asset holdings of the global CBFs in our sample, but we did obtain country weights for a subsample of our funds from Morningstar. More specifically, for 40 global CBFs managed by a European asset management company and 7 global CBFs managed by a U.S. asset management firm, we have data on the proportion of total asset invested in each country. Table 6 presents these portfolio weights by region at the end of 2010. We also include the regional weights of the UBS

Global Convertible Bond Index as a benchmark. Interestingly, we only observe a home bias for the global funds with a U.S.-based manager: global funds of a U.S. management firm hold, on average, 49.1 percent of their total assets in U.S. securities, while the benchmark weight is 46.1 percent. Global funds of European managers hold on average 32.4 percent of their assets in U.S. securities. Both European and U.S. management firms underweight European securities in their global CBFs. However, there is a clear distinction: while European firms only slightly underweight European assets – 25.8 percent of total assets, relative to a benchmark weight of 28.1 percent – U.S. management firms strongly under-invest in European securities, with an average weight of only 9.9 percent of total assets. In the mean time, Asian securities and assets from other regions[8] are overweighed by both European- and U.S.-based asset management companies. It is important to note that Table 7 represents only a snapshot of the portfolio holdings of a small subsample of our data. As all funds in our sample are actively managed funds, regional portfolio under- and overweights will fluctuate over time according to the manager's portfolio allocation decisions. A plausible explanation for the relative low weight that is given to European securities is related to the European debt crisis, which caused a significant increase in spreads for, at least some, European bonds and created a high volatility on European bond markets. Still, it seems that European-based manager are relatively optimistic or overconfident about European securities, or that European managers have an information advantage over (certain) local securities, which makes them hold more of these local assets. The same reasoning might explain the relatively larger holdings of North-American assets by U.S.-based managers. Both over-optimism and over-confidence for local securities and information asymmetries have been shown in the literature to explain, at least part of the home bias (respectively Strong and Xu, 2003; Kilka and Weber, 2000; Karlsson and Nordén, 2007; and Van Nieuwerburgh and Veldkamp, 2009; Ahearne, Griever, and Warnock, 2004).

Table 7: Regional Portfolio Weights for the Global Convertible Bonds, December 2010

This table contains the average proportion of total asset invested in each region for 40 global CBFs with a European-based manager and 7 global CBFs from a U.S.-based asset management company at December 2010. For comparison, the second column shows the regional weights for the UBS Global Convertible Bond Index at the end of 2010.

Region	Benchmark	Global CBFs Eur manager	Global CBFs U.S. manager
Asia	21.94	30.82	31.87
Europe	28.08	25.82	9.85
North America	46.13	32.35	49.13
Other	3.79	11.00	9.14

As the average portfolio weights in Table 7 are only based on a relatively small subsample of our data on a particular point in time, we try to formally test whether global CBFs are home biased, by regressing the global CBF returns on regional factors. We

[8] Other regions include Australia, New Zealand, Latin America, Africa and the Middle East.

determine whether the factor loadings are significantly different based on the nationality of the management company.

Table 8 presents the estimation results for equation (5):

$$gcbf_{i,m,t} = \alpha + \sum \beta_m^{eu} * eq_{r,t} + \sum(\beta_m^{us} - \beta_m^{eu}) * D^{us} * eq_{r,t} + \sum \gamma_m^{eu} * bd_{r,t} + \sum(\gamma_m^{us} - \gamma_m^{eu}) * D^{us} * bd_{r,t} + \sum \delta_m^{eu} * op_{g,t} + \sum(\delta_m^{us} - \delta_m^{eu}) * D^{us} * op_{g,t} + \varepsilon_{i,m,t}. \quad (5)$$

Table 8: Regional Factor Loadings for Global Convertible Bond Funds by Nationality of the Asset Management Company

	coeff	s. e.	Coeff	s. e.	coeff	s. e.	coeff	s. e.	coeff	s. e.	coeff	s. e.
						Equity factors						
eq_eur	0.205***	0.026	0.126***	0.024	0.174***	0.026	0.211***	0.019	0.156***	-0.016	0.168***	0.016
eq_us	-0.028	0.022	0.058**	0.026	0.016	0.024	-0.040*	0.022	0.003	0.018	-0.010	0.017
eq_asia	0.135***	0.021	0.162***	0.017	0.122***	0.015	0.153***	0.020	0.167***	0.016	0.129***	0.014
D^{us}* eq_eur	-0.201***	0.023	-0.090***	0.016	-0.176***	0.019	-0.153***	0.017	-0.076***	0.015	-0.120***	0.015
D^{us}* eq_us	0.207***	0.019	0.147***	0.020	0.172***	0.025	0.192***	0.020	0.156***	0.019	0.164***	0.021
D^{us}* eq_asia	0.024	0.016	-0.007	0.011	0.031**	0.015	0.010	0.014	-0.005	0.011	0.022	0.014
						Bond factors						
term_eur	0.551***	0.028			0.252***	0.026	0.542***	0.021			0.256***	0.027
term_us	-0.118***	0.029			-0.046*	0.023	-0.106***	0.032			-0.036	0.026
term_asia	0.007	0.026			0.028	0.020	-0.010	0.024			0.023	0.019
D^{us} * term_eur	-0.373***	0.021			-0.214***	0.030	-0.410***	0.019			-0.244***	0.031
D^{us}* term_us	0.115***	0.025			0.052**	0.024	0.120***	0.023			0.055**	0.021
D^{us} * term_asia	0.162***	0.021			0.151***	0.017	0.171***	0.018			0.151***	0.015
deft_eur	0.624***	0.073					0.607***	0.078				
deft_us	0.022	0.055					0.034	0.057				
deft_asia	-0.016	0.034			-0.001	0.027	-0.022	0.034			-0.001	0.028
D^{us} * deft_eur	-0.277***	0.088					-0.307***	0.087				
D^{us} * deft_us	0.110**	0.043					0.113**	0.046				
D^{us} * deft_asia	0.062**	0.025			0.057***	0.022	0.071***	0.022			0.061**	0.024
bond_eur			0.667***	0.027					0.638***	0.021		
bond_us			-0.125	0.077					-0.071	0.087		
bond_asia			-0.029	0.024					-0.035	0.022		
D^{us}* bd_eur			-0.530***	0.019					-0.543***	0.019		
D^{us} * bd_us			0.177***	0.043					0.169***	0.038		
D^{us} * bd_asia			0.267***	0.016					0.262***	0.015		
hy_eur					0.326***	0.035					0.326***	0.032
hy_us					-0.121***	0.041					-0.119***	0.044
D^{us} * hy_eur					-0.186***	0.033					-0.199***	0.031
D^{us} * hy_us					0.189***	0.040					0.203***	0.036

Table 8: continued

	coeff	s. e.	Coeff	s. e.	Coeff	s. e.	coeff	s. e.	coeff	s. e.	coeff	s. e.
						Option factors						
vola_eur	0.004	0.011	0.020	0.014	0.001	0.013	0.003	0.011	0.017	0.015	-0.000	0.014
vola_us	-0.003	0.013	-0.013	0.016	0.001	0.015	-0.003	0.013	-0.010	0.017	0.003	0.016
vola_asia	-0.003	0.006	-0.000	0.007	-0.002	0.006	-0.002	0.006	-0.001	0.007	-0.003	0.006
D^{us} * vola_eur	0.002	0.006	-0.004	0.005	0.003	0.007	0.005	0.007	-0.003	0.004	0.006	0.008
D^{us} * vola_us	-0.002	0.007	0.003	0.005	-0.003	0.009	-0.003	0.007	0.002	0.005	-0.006	0.009
D^{us} * vola_asia	0.003	0.004	0.001	0.003	0.002	0.004	0.003	0.004	0.002	0.003	0.003	0.004
NL1_eur	0.000	0.032	0.049	0.027	-0.012	0.028						
NL1_us	-0.023	0.027	-0.096***	0.028	-0.047*	0.026						
NL1_asia	0.041**	0.017	0.017	0.014	0.018	0.012						
D^{us}* NL1_eur	0.093***	0.029	0.022	0.021	0.101***	0.025						
D^{us} * NL1_us	-0.028	0.028	0.013	0.025	-0.014	0.027						
D^{us} * NL1_asia	-0.0210	0.015	0.008	0.010	-0.009	0.013						
NL2_eur							0.090	0.190	0.212	0.232	-0.013	0.204
NL2_us							-0.072	0.177	-0.341*	0.137	-0.184	0.142
NL2_asia							0.058	0.114	-0.035	0.077	0.026	0.082
D^{us} * NL2_eur							0.315**	0.159	0.179*	0.108	0.414***	0.139
D^{us} * NL2_us							-0.096	0.238	-0.024	0.178	-0.023	0.220
D^{us} * NL2_asia							-0.045	0.059	0.004	0.030	-0.010	0.038
Constant	0.000	0.001	-0.002	0.001	0.000	0.001	0.001	0.001	-0.001	0.001	0.000	0.001
Adjusted R^2	0.602		0.611		0.609		0.600		0.610		0.609	

* 10% significance
** 5% significance
*** 1% significance

A first observation from Table 9 is that global CBFs managed by a European asset management firm, load predominantly on European equity and bond factors, indicating a home bias. Asian equity returns are also a factor in explaining European-managed global CBFs, but U.S. equity or bond factors seem to have no or only a weak influence on these global CBFs. Second, we observe a similar home-effect for U.S.-managed global CBFs: coefficient estimates for the U.S.-manager dummy and the European equity and bond factors are significantly negative, indicating that global CBFs managed from the U.S. are less sensitive to changes in the European equity and bond markets. In the meantime, the coefficients of the dummy times the U.S. equity and bond factors are positive and significant, indicating an overweight of U.S. securities for global CBFs managed in the U.S. relative to global CBFs managed in Europe. Third, not only do portfolio managers overweight their home region, there also is a difference based on the nationality of the management firm in the factor loadings for Asia: although the factor loadings on Asian equity are similar for U.S-based and European-based managers, in most of the regression specifications U.S.-based managers have significantly higher factor loadings on Asian bond factors than European-based managers. Lastly, the option factors once more point to the absence of an option-effect in global CBF returns.

Conclusion

Being a hybrid security, the convertible bond can be constructed by the issuing firm such that the security behaves more like an equity or more like a bond. Consequently, convertible bond funds can have more characteristics of an equity portfolio or a bond portfolio depending on the specific convertibles composing the portfolio. We show that the equity-like or bond-like aspects of the convertible bond fund are region specific: the equityness in U.S. CBFs is higher than in European and Asian CBFs, that behave more like a bond portfolio. This finding is simply due to the fact that U.S. convertibles are, on average, more equity-like than European and Asian convertibles. This would imply that global CBFs are comparable amongst each other, as these funds are supposed to hold a balanced proportion of the different regional assets. Our results however show that asset managers tend to hold home-biased portfolios: global CBFs managed by a European asset manager are more bond-like than global CBFs managed by a U.S. manager. This finding may have important repercussions for investors and portfolio managers, who can be confronted with different expectations. For example, when a U.S. investors buys a global CBF from an European issuer, the investor might expect the fund to correlate strongly with global equities, which he might use as his personal benchmark. However, the portfolio manager will compose the portfolio to correlate more strongly with bond indices, resulting in suboptimal portfolios with concentrated risk exposures.

A potential flaw in our study on global CBFs, is that we only have information on the nationality of the asset management firm, not the individual portfolio manager of the funds. Thus, a fund from, for instance, JP Morgan, might be managed by a French portfolio manager, while a fund from UBS can be under the supervision of a U.S. manager. Our data cannot pick up this effect. However, even if the nationality of the personnel at an international asset management firm might be diverse, it is plausible to assume that the majority of personnel at UBS is Swiss and most of the managers at JP

Morgan is American. Also, a fund manager can change jobs or get fired, being replaced by someone having a different nationality. Anyhow, there still seems to be an important top-down effect: our results indicate that the nationality of the asset management firm crucially affects the composition and the characteristics of global convertible bond funds.

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Appendix A: Construction of explanatory variables

Table A.1 presents a detailed description of the indices that were used for the construction of the explanatory variables in our regression specifications (1) and (4).

Table A.1 Indices used to construct the explanatory variables

Data on equity and bond indices are retrieved from Datastream. Constituents lists of the UBS Convertible Bond Indices are obtained from UBS.[9] Data is downloaded both in USD and in local currency.

	Europe	U.S.	Asia	Global
Regional Stock	MSCI Europe	MSCI USA	MSCI AC Asia	MSCI World
Term Factor	Barclays Euro Gov 1 Month EUR	Barclays U.S. Gov 1 Month USD	Barclays Asia Pacific 1 Month JPY	Barclays Global Gov 10+ JPM GLOBAL CASH 1M
Default Factor	Barclays Euro Corp	Barclays US Corp	Barclays Asia Pacific	BOFA ML GLB BROAD
High Yield	Barclays Euro HY	Barclays US High	NA	Barclays Global HY
Bond Factor	Barclays Euro	Barclays US	Barclays Asia Pacific	Barclays Global
Volatility	UBS CB Index	UBS CB Index US	UBS CB Index Asia	UBS Global CB Index
Non-linear 1 (NL_1 and	UBS CB Index Barclays Euro 1 Month EUR	UBS CB Index US Barclays US 1 Month USD	UBS CB Index Asia Barclays Asia Pacific 1 Month JPY	UBS Global CB Index Barclays Global JPM GLOBAL CASH 1M

* The option factors VOL, NL_1 and NL_2 are constructed with the underlying equities of the convertible bonds that are member of the respective UBS Convertible Bond Indices.

[9] Disclaimer: see Appendix A.2

Appendix B: UBS disclaimer

 The name UBS Global Convertible Bond Index and the names of the related UBS AG sub-indices (together the "UBS Indices") are proprietary to UBS AG ("UBS"). UBS and MACE Advisers Ltd (the UBS Global Convertible Bond Index Calculation Agent) are together the "Index Parties".

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